Volume 1 Number 22
December 14, 1981

Editor: Vern Riportella, WA2LQQ
Contr. Editor: Bob Nickels, KEØT
Managing Editor: Bob Myers, W1XT

AMSAT SATELLITE REPORT

Hams In Space to the Nth

Public attention has been recently focused in an extraordinary way on amateur radio. This has got to be the ultimate hams in space story.

In the December issue of *Science 81*, published by the American Association for the Advancement of Science, appears an item on page 10 of interest to amateurs. The story concerns the NASA project called SETI (Search for Extraterrestrial Intelligence) and the obsessive efforts of one Senator William Proxmire to kill the long-standing effort with the budget cleaver. Senator Proxmire claimed that at a time when budgetary constraints were strangling many social programs, $2 million per year on this project was a needless luxury the nation could ill-afford. Proxmire was quoted as denigrating the possibilities of "finding intelligent life right here in Washington" much less outer space!

AMSAT President Dr. Tom Clark, W3IWI, is a radio astronomer for NASA. Tom was one of the pioneers in the SETI field. For nearly two decades various SETI projects have scanned the heavens with large radio telescopes and complex signal analysis techniques looking for some signal indicative of life elsewhere in the cosmos. Attention is focused on certain frequencies which are thought to be universally significant throughout the universe. One such frequency is the emission line of atomic Hydrogen at about 1420 MHz. Pulsars were at first thought to be signals from "them." They turned out to be a natural phenomenon.

For years SETI has been the realm of the most exotic and expensive equipment in the world requiring the likes of Jodrell Bank (England) and Arecibo (Puerto Rico). Now comes a Stanford University radio astronomer, Ronald Bracewell to assert that with the Proxmire ax descending to end all SETI programs, "The important contacts with extraterrestrial life will be left to radio hams."

The ARRL publication *Amateuradio* quotes Dr. Bracewell as follows: "An amateur will be the first, because there are thousands of ham operators listening daily on the frequencies that are most likely to be used by an intelligent race out in the cosmos. The lonely scientist who is listening for signals from space is heavily outnumbered."

ASR wonders what frequencies Dr. Bracewell had in mind that those thousands of hams are listening to daily. I can't begin to imagine what might happen if an alien showed up on Los Angeles repeater AD6P! From the goings on on that machine in the past year perhaps they've already landed.

The *Science 81* article quotes Dr. John Billingham, the SETI Program Manager as being "Surprised and disappointed," at the budget cuts. Billingham had planned to begin scanning the skies in 1983 with a large telescope and a multi-channel spectrum analyzer which would have enabled isolation of meaningful signals originating at distances up to 1000 light years. Interestingly, this spectrum analyzer was designed in large measure by AMSAT's W3IWI as part of his NASA work. Tom remains notoriously skeptical with regard to the whole subject. He sees arguable points to be made on both sides of the question about intelligent life "out there." But as regards hams being the first he says that "They are at about a 100 dB disadvantage. It could be 80 dB. . . but it is a very big number anyway." The implication is don't hold your breath.

In a related development in a U.S. scandal sheet called the *National Inquirer* a little known scientist from Secaucus, New Jersey says he believes that aliens will most likely try to communicate with earthlings using a very popular frequency, namely channel 14 (of the Citizens Band; 11 meters). "Where else, with the possible exception of AD6P, could an alien cry out 'Smokey break 19' and get both a clear channel and a clear passing lane for an 18 wheel saucer?"

We can just hear the truckers now.

"What the h. . . was that goin' by?"

"Donno, Jake, but didja ketch them gum ball machines? Wild!"

AMSAT UK Activity Week Winners

Richard Limebear, G3RWL, has announced the winners of the most recent Activity Week held in early October. In the transmitting category Bruce Balla, VE2QO, of Montreal placed first with 1596 points. Following him were, in order of finish, OK3AU, JF3HKY and G4CUO. In the SWL category, first place was garnered by Mr. D. Hudson. 9M2CR placed second in the SWL category. G3RWL was the umpire for this, the second AMSAT UK Activity Week held. Congratulations to the winners and to all the participants.

New UoSAT Orbit Predictions

N5KR, Bill Johnston, is providing a UoSAT version of his Perpetual Orbital Prediction Printouts. With this computer run based on your exact QTH you can obtain precise antenna pointing bearings in one minute (time) increments. For example, if you know the time and longitude of UO-9 EQX, Bill's computer has done the rest for you. He is marketing this product by mail at modest prices. See N5KR's ad in *ORBIT* classified, *ORBIT* #9, or write to him at: William Johonston, N5KR, 1808 Pomona Drive, Las Cruces, NM 88001. A SASE is required, please. And tell Bill *ASR* sent you!

AMSAT Startup Orgs: SM, HB

AMSAT Headquarters has been made aware that active amateur satellite-interest groups are moving towards a more formal organization in Sweden and Switzerland. A delegation from Sweden recently attended the Packet Radio Forum in Maryland on 16 Oct. 81 (See *ASR* #19, pg. 4) which was jointly sponsored by AMSAT, AMRAD and ARRL. Active European groups are now present in the UK, France, Netherlands, Belgium, Germany, Hungary, Italy.

Orbital Data Update

The following are recent updates on the orbits of AMSAT-OSCAR 8 and UoSAT OSCAR 9.

AO-8	Bulletin #601
Reference Epoch:	81 329.53263883 (Orbit 18987)
Inclination:	98.7987
RAAN:	358.5350
Eccentricity:	0.0007639
Argument of Perigee:	94.0929
Mean Anomaly:	266.1105
Mean Motion:	13.96365154
Mean Motion Derivative:	5.55E-6 (Drag factor)
UO-9	Bulletin #50
Reference Epoch	335.82879893 (Orbit 852)
Inclination:	97.4622
RAAN:	296.9228
Eccentricity:	0.0005440
Argument of Perigee:	96.2604
Mean Anomaly:	263.9252
Mean Motion:	15.11362803
Mean Motion Derivative:	0.00011492 (Drag factor)

Average Periods and Increments, from 16 Dec. to 23 Dec.

AO-8	Period: 103.17948 min	Increment: 25.79703°
UO-9	Period: 95.31353	Increment: 23.82897

Reference Orbits:

	16 Dec.		23 Dec.	
AO-8	#19272 00:36:35	75.66°	#19370 01:08:10	83.77°
UO-9	# 1066 01:29:03	156.1°	# 1171 00:16:58	138.2°

Thanks to KA9Q and W3IWI for this data.

Phase IIIB Launch Moves Forward

Latest planning date for the launch of AMSAT's first Phase III bird is now 6 July 82 says F8ZS. John, who serves ESA in an official capacity and is an active amateur satellite organizer in France, has often been the first source of reliable news on future ESA plans as they affect Phase III. At press time John was in fact traveling from Paris to Kourou to prepare for the LO-4 test of Ariane (see related story elsewhere in this issue). In a telephone call from his Paris office to *ASR* offices in New York, John explained that he would also be operating the club station at Kourou, FY7KRU, as official duties allowed.

The advancement from a planning date of "mid October" to the July date was seen as a mixed blessing by AMSAT officials contacted in Washington. On the one hand it is encouraging to see the schedule advance since more often than not there are schedule slippages which *delay* launch. Also, moving schedules ahead a modest amount can mean nominal savings in staffing costs. On the other side of the coin, a schedule advance reduces any slack that might have been used to correct unforseen difficulties.

As things stand now, the spacecraft (Phase IIIB) should be ready to be shipped well ahead of the deadline and all appears clear sailing as reported by AMSAT engineers and program managers on both sides of the Atlantic. Recent progress was made in developing the LIU (Liquid Ignition Unit) used for the fuels control. The LIU is now going to final PCB work. Work continues on fabricating and testing the plumbing associated with the liquid fuel rocket being supplied by MBB of Germany. WD4FAB and W4PUJ are working closely with AMSAT DL in the execution of this critical phase of hardware engineering.

With the advance in the schedule, AMSAT will commence its series of columns on Phase III called "Phase III Countdown" in *ASR*. Originated by Pat Gowen, G3IOR, for the Phase IIIA launch, Pat's Countdown went to all member IARU societies and AMSAT officials. Now it has been agreed that *ASR* functionally is the best vehicle for the job and will therefore carry the column on a semi-regular basis. That means whenever there is enough news on Phase IIIB progress to justify a full column. (See also *ASR* #11, page 1.)

OSCAR Completes Second Decade

This week marks the start of the *third* decade of amateur radio satellites. OSCAR 1 was born exactly 20 years ago this past Saturday, 12 Dec. In the interim the "OSCAR" concept has captured the imagination of tens of thousands of amateurs, presidents, senators and kings. The amateur community has launched 11 OSCARs into orbit (two were dubbed Radio Sputnik; we use OSCAR generically here) and each new generation has been more capable (and hence more complex) than the prior. With UoSAT OSCAR 9 just two months old, one or more Radio Sputniks expected at any moment and Phase IIIB just a few months away, this is indeed a major milestone in OSCAR chronicles. Congratulations to. . .US. . .*all* of us on these 20 years of achievement. By gosh! Can you imagine what the next 20 might be like?!

ASR *Spotlight On: W2FPY*

There are so many "trails" to follow in pursuit of the "real" Steve Robinson, W2FPY, that one hardly knows where to begin. For instance, here's an intriguing apsect: For nearly 24 years Steve has known two OSCAR pioneers, W3PK and W2RS. In fact Steve was friends with AMSAT founder Perry Klein and satellite pioneer Ray Soifer when all three attended high school in suburban New York. Strangely, our subject escaped the satellite "bug" for nearly two decades only to be innoculated with a serious case three years ago. Yes, that *would* be an interesting story to pursue. But wait. . . there are others.

Try to imagine a person who is one of the most brilliant persons you know. Then add to this image the character of a man so intensely modest that he cringes a bit inside when others appreciate him publicly. For example, when Steve was recently appointed AMSAT's Director of Research and Development, he asked your Editor to not mention the fact that he holds a Doctorate in Biophysics/Physiology. Steve said he felt the appelation, "Dr. Robinson" was repugnant to hams in an atmosphere of amateur activities. Your Editor replied he felt AMSAT members would be pleased knowing R&D was being managed by a highly qualified individual such as himself.

Now, with this image planted, let's see how fate, after two decades, brought this humble genius into the AMSAT fold.

As part of his post-doctoral work Steve was frequently required to drive the 600 km (360 miles) or so from Philadelphia to the University of Maine where some of his research was performed. The boredom of the long trip made him look for alternatives to talking to himself. Although he had virtually shut out ham radio since entering Massachusetts Institute of Technology in the late fifties, he wondered if a 2 meter FM rig in the car would help. He hates to admit it but he does acknowledge that "2 meter FMing was my ticket back to active hamming."

Then he thought to renew his friendship with W3PK and W2RS who were both active AMSAT members. It was through his friendship with these two veterans that Steve became heavily involved not only as an AMSAT member but as a valued contributor to spacecraft hardware and design. About three years ago he volunteered to do some PCB layout on the Phase IIIA computer. He wound up doing a major design effort as well. Steve likes to tell of the time when to improve the adhesion of PCB artwork tape he sprayed it with an aerosol material. The can label said it was "for PCB artwork." No sooner did he spray the layout then the entire grid of tape lifted off the paper writhing as a million snakes and then, coalescing to an ugly blob, mocked Steve's wondering eyes. Well, the wire-wrapped prototype worked and the final computer worked too, thanks in large measure to Steve's efforts.

Steve sees his function as R&D Director as twofold. On the one hand he sees a major task in improving today's satellites reliability especially in the area of radiation vulnerability (hardness). On the other hand, he recognizes the importance of having a "guide" out front

watching for technological developments and alerting AMSAT management to those that hold particular promise in the world of amateur satellites. His current projects include preparing the Phase IIIB memory for radiation testing in one of the world's largest particle accelerators. This *does* seem a bit advanced from the traditional OSCAR "build it in your basement" concept, doesn't it? Yet this is what it now takes to field successful amateur radio satellites into high orbits and to have them work for four years or more!

Steve has characteristics much in common with a few other AMSAT folks we know like W3GEY adn W4PUJ, not to mention DJ4ZC et al. Steve enjoys most the designing, testing and building of the satellites. Once it's done and in orbit he's on to something else. Packet radio for instance. "How about packet radio on Phase III," he muses. "What if" this and "how about that" are terms often heard in dialog with one self-admitted "windbag ham who loves to gab." It occurs to your Editor that without the forward looking vision of chaps like W2FPY we would still be thinking in terms of OSCAR 6 instead of Phase IIIC, SYNCART and beyond. According to Steve, he is "totally absorbed in the satellite field and too busy building for the future to spend much time operating."

AMSAT is the better for this we are assured from having known this truly remarkable character. He would be outstanding on virtually any campus; AMSAT is terribly privileged to have this modest intellectual on our team. (By the way, to spare him some embarassment, please don't mention this column to Steve when next you meet him; when he read it at first, he suffered a case of "near-terminal cringe."

The Spotlight Bias: It has occurred to your Editor and it must have occurred to many readers that the "Spotlight" column seems unduly biased towards U.S. amateurs. There is a reason for this. It is simply communication. There are dozens of potential "Spotlight" subjects around the world of amateur satellites but we're not omniscient. We need your help to feature worthy individuals and highlight their achievements and contribution to our hobby. If you know someone whose story you believe needs to be told, then why don't *you* help to tell it? It's easy. Write what you know of the subject and then try to interview him without him really being aware. A quality black & white photo or two is essential. (Color does not print well when copied for *ASR*.) Won't you help us tell the story of those many unsung heroes out there? How about it, VK, ZL, JA, DJ, PA, G, ZS? Have you no one you think is worthy? Send materials to *ASR*, P.O. Box 177, Warwick, NY 10990. Material will be carefully studied and usable material will be printed. However, no manuscripts can be returned without an SASE enclosed. Finally, let's also hear from a few U.S. folks as well.

UK Donation Swells Phase III Fund

AMSAT UK Secretary Ron Broadbent, G3AAJ, has announced the donation of 1000 pounds Sterling to AMSAT for the Phase III program. All AMSAT members sincerely appreciate the generosity of AMSAT UK colleagues.

Details on UoSAT (Continued)

Radiation Detectors Experiment: (D.R. Lepine, Appleton Laboratories, UK, Ian Ferebee, G6BTU, UOS-AMSAT, UK)

The radiation-monitors experiment employs two LND type Geiger-Mueller tubes to measure integrated fluxes of electrons above threshold energies of approximately 20 and 40 keV. The tubes have thin mica end-windows of thickness 0.35 ± 0.05 mg cm*−2 and 1.75 ± 0.25 mg cm*−2 respectively, and are filled with neon together with a small quantity of halogen to provide quenching. In addition to detecting electrons the tubes also detect protons of approximately twenty times higher energy.

Each tube is contained in a seperate housing which also contains a thick-film pulse-amplifier/pulse-shaper to provide 10v, 50 uS pulses to the on-board data handling system. A single high voltage converter, generating 560v and stabilise to ±20v (−40 to +60°C), provides the anode supply for the tubes. A collimator consisting of two circular apertures seperated by an 8mm spacer, is located in front of the tube to define the geometry-factor.

Data from the experiment will be telemetered to ground using two seperate formats. High time resolution data, where each detector is sampled for ten 0.05s periods every 1s, will be stored by the on-board primary microcomputer and then transmitted to the ground 'on-command' using one of the general or engineering data beacons. It is proposed to schedule the experiment so that the data accumulation phase corresponds to the satellite passing over the more interesting precipitation regions, i.e. the auroral oval and polar caps. The exact quantity of data that can be stored during a pass has still to be determined. In addition to high time resolution data for the computer, the experiment also averages the count in every 5s period and mades the result available to the telemetry system where it is transmitted in real time. It is hoped that this feature will be made available on a continuous basis.

Instruments of this type have been used by the RAL Magnetospheric-Plasmas Group on several sounding rocket flights to measure the intensities of electrons producing auroral displays.

Tube	LND705	LND710
Approx. energy threshold (keV)	20 keV	60 keV
Window thickness (mg cm*−2)	0.35 ± 0.05	1.75 ± 0.25
Geometric factor	0.08	0.35
Collimator dia. (mm)	8.0	8.0
Angle to s/c z axis (degrees)	13	18
Filling gas	neon + halogen	neon + halogen
Operating temp.	−50 to +150°C	−50 to +150°C
Sampling rates:		
stored data	10 per sec.	10 per sec.
real time data	8 secs	8 secs

Microwave Beacon Experiment: (Jim Arnold, Plessey Research, UK)

A beacon on 10.47 GHz will transmit a steady carrier for tracking and propagation studies.

Power o/p: 125 mW
dc i/p: 1.96 watts
modulation: carrier
max. doppler: ±223 Khz
path loss o/h: −169 dB
horiz: −181 dB

Saturday Test Ariane's Last

The European Space Agency's (ESA) fourth and final test launch of the Ariane rocket will take place this Saturday night. At this writing, liftoff was slated for between 0215 and 0312 UTC Saturday. This is Friday evening in the United States, Canada and Mexico. Aboard LO-4 will be the European MARECS A (Maritime European Communications Satellite, Level A). This will be the first Ariane night launch from the Kourou, French Guiana, South America, ESA facility. Prior launches have been scheduled for the early morning hours around dawn when air turbulence and the possibility of storms is minimal. The prior launch, LO-3, was a resounding success lifting off from Kourou 19 June 81 (See *ASR* #11, page 2). LO-2 on 23 May 80 was a disaster. The ill-fated second test launch carried AMSAT's Phase IIIA bird down in a fireball along with the Firewheel experiment of the Max Planck Institute. LO-1 was a success having been launched on Christmas Eve morning, 24 Dec. 79.

Following a successful launch this weekend, ESA will complete the planned four test launches. The first operational mission, L5 will be launched late Winter or early Spring 82. Intense jockeying for position in line for launch availability is evident.

AMSAT plans no ALINS (AMSAT Launch Information Network/Service) coverage of the LO-4 test launch. The limited budget associated with Phase III does not permit expending the estimated $400 to $500 in toll telephone charges that is required to establish an effective network. The UoSAT Launch ALINS cost was, for example, in the $400 range. However, AMSAT officials were looking into the possibility of some special event station on the air at launch time. Plans were incomplete at this writing. Any activities scheduled will be announced on the regular AMSAT HF nets and possibly other amateur communications services such as the ARRL bulletins on W1AW. Stay tuned for further developments.

New/Interesting DX

EL2CA is now active. UA1CNA is on Mode A (cw) and looking for U.S. contacts. WAØLPK/KL7 is a Mode J (ssb) regular.

Another "First" Claimed

Larry Roberts, W9MXC, responding to an article in *ASR* #16 points out a "first" that he has chalked up. Larry claims to be the first to have worked Navassa Island on OSCAR. This was accomplished during the 1978 DXpedition to Navassa by WØZH/KP1. Larry, who edits the Mode J Newsletter says: "Haven't done a lot of 1st things in my 20 plus years of hamming. . . but the [QSL] card is in a very special place on the shack wall." Congratulations!

AMSAT Satellite Report *is published and mailed First Class bi-weekly by The Radio Amateur Satellite Corporation, P.O. Box 27, Washington, DC 20044 for the purpose of enhancing communications about the Amateur Radio Satellite Program. Subscription rate is $18.00 ($26.00 overseas) yearly by check or money order to "Satellite Report," 221 Long Swamp Road, Wolcott, CT 06716. Information published herein may be quoted without permission provided credit is given.*